The emerging field of synthetic biology: a review

Abstract :

Synthetic biology which is concerned with engineering organisms to perform novel functions and developing the ways by which organisms can be engineered easily and robustly, is a relatively young field with a large potential for growth. Much of the work in the field involves design and construction of genetic circuitry, the piecing together of biological parts, such as promoters and ribosome binding sites, to form the basis for biological devices which are organisms that have an engineered, well-specified input-output behavior. The idea in synthetic biology is applying engineering principles, such as hierarchical design, modular reusable parts and standard interfaces to construct bio-systems. The results of these engineering efforts can be of great value to human interests such as medicine and industry. In this paper first some related terms and resources for synthetic biology are described. Then existing computational tools and methods for synthetic biology are explored. It is followed by a discussion on current challenges in the field and future directions and finally by conclusion.